

Technology transfer in Africa:
opportunities brought by ICT and the challenge of going beyond

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Technology transfer is a challenging issue in Africa for the three types of technology identified, either they are embedded into a specific product (seeds or chemical product), or they pertain to cultivation techniques requiring or not the use of a specific product¹. Whatever the type of technology is, the provision of proper information is key. The wisdom of providing the information for proper use has sometimes been lost, like at the start of the commercial release of GM cotton in various countries, hence contributing to the troubles encountered later on in terms of resistant weeds or of pest complex shift.

The large diffusion of new ICT tools gives the opportunities for better information diffusion. Almost all farmers in poor African cotton countries possess mobile phones. The access to market prices of agricultural products is the most frequently quoted contribution of ICT to farmers' income. But this opportunity is limited by the basic type of cellphones being used and by the high rate of illiteracy among farmers, not mentioning that technology transfer is not only a matter of ICT.

New ICT tools or apps can provide complex information in graphical representations whose messages are easier to catch. But this is still out of reach of African farmers who seldom have smartphones and who need training and assistance to comprehend graphical representations.

Farmers are at least indirectly involved in data collection and evaluation which has been made more effective by new ICT tools. The Data collection and evaluation is a vital part of development work enabling to better know who farmers are, what are their needs and how to help meet them. This area is subject to international exchanges under the auspices of international organizations, providing valuable lessons on the most adapted apps to a local context, on the requirements for an effective collection and evaluation of data and on the condition of a conducive environment for a sustainable process.

As the availability of new ICT tools could not be sufficient by itself to improve information diffusion, a better outcome could result from their combination with less modern tool like radio-broadcasting. This combination could allow farmers to have access to technical information where they are, when they are available and in languages that they are familiar with.

¹ For example, the technique of early sowing in areas of low soil temperature asks for the use of plastic film

The issue of technology transfer in Africa cannot overlook the lack of farmers' familiarity with the notion of yield when they have very vague knowledge of the sizes of the plots they grow on and which are seldom delimited and could hence vary from year to year. The challenge of technology transfer is associated to that of popularizing the notion of yield and the command of the plot sizes so that farmers could observe the improvement brought by the technology transferred. More generally, the basic challenge is to allow farmers to keep record of their production inputs and outputs, so as to possess references to which the value of the technology transferred is assessed.

It is worth emphasizing that beyond information diffusion, that of accurate information is much more key in the presence of fake products. Quality control and crossed-checked information is required from a reliable and independent body, but the needed investment used to lack.

Finally technology transfer is not only influenced by information diffusion, but by an actual and timely access to the needed inputs, an acceptable certainty of selling out cotton at an acceptable price, as well as production credits. Political will and sectoral organization are required. Unfortunately, even so, the facilitation for production credits used to miss, leaving farmers in the hands of usurious money lenders who capture their benefit.

In short, new ICT tools can potentially improve information diffusion in favour of technology transfer. This opportunity could be an illusion if there is no sufficient political will and sectoral organization to address the conditions beyond information diffusion to promote technology transfer.

6th Open Session
Opportunities and challenges for technology transfer in cotton

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3 types of technologies identified

- Technology embedded into a specific product
 - Genetic progress embedded into varieties available through seeds
 - More effective and less harmful chemicals to control pests
- Technology totally not embedded into a product
 - New cultivation methods
- Technology requiring the use of an additional product
 - Cultivation based on plastic mulching
 - Cultivation with growth regulation
 - ...

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Opportunities and challenges mainly similar
regardless of the technology type

- Proper information for optimal use is key
 - Common requirement to all types of technology
- This wisdom has sometimes vanished with some new technologies
 - Typical case of GM seeds
 - "sow them and go to beach"
 - "use them every year and on every field"
 - ⇒ issue of increasing number of resistant weeds and of pest complex shift

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Opportunities (for better information diffusion)?

- Why do we feel opportunities are there?
 - Mainly because of new tools, devices and approaches in ICT
 - ...and almost general possession of mobile phones by farmers
 - Survey conducted in 2014:
 - percentage of farmers having cellphones
 - » Togo: 72.4%
 - » Benin: 100%
 - » Burkina Faso: 96.7%
 - percentage of women in farms having cellphones
 - » Togo: 4.8%
 - » Benin: 35.7%
 - » Burkina Faso: 35.1%

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Challenges?

- Why do we feel challenges remain?
 - because new tools, devices and approaches in ICT have limitations...
 - farmers are frequently illiterate
 - ...and because technology transfer is not only an issue of ICT

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Opportunities for technology transfer: Access to market prices made easier

- ⇒ easier for farmers to decide where and when to sell



A Kenyan farmer sends a text message to enquire about the latest maize prices from her maize field in Thigio, near Nairobi.

Photograph: Antony Njuguna/Reuters

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Positive impacts of better access to market prices

- Some impacts are reported
- in East Uganda
 - prices obtained in selling maize are 17% higher for affiliating farmers
 - People providing the service of recharging mobiles gain US\$ 40/month

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But limitations remain (1/2)

- Issue of illiteracy of the majority of farmers
 - Percentage of illiterate farmers in 2014

Togo	Benin	Burkina Faso
58.4	49.2	37.2

- Situation worsened after a civil conflict
 - Ivory Coast, in 2013

Illiterate farm heads	Kids attending primary school	Kids attending secondary school	Illiterate kids working in fields
80.4	44.0	16.9	87.2

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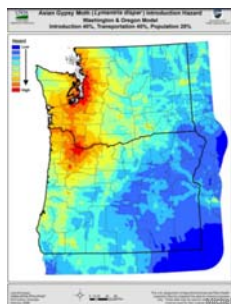
But limitations remain (2/2)

- Issue of making information on market prices furthermore accurate
 - Not easy to capture market prices
 - Bias from declarations which are hard to verify

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Opportunities for technology transfer: access to complex information made easier



- Access to more complex information
 - But made easier for farmers to comprehend

Hazard level and its geographical distribution of a grasshopper

Representation based on a model with assumptions on introduction, transportation and population of the pest

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But limitations remain

- Farmers only have basic cell phones and not smartphones
- Farmers' access to Internet through cell phone remains very marginal
- Graphical GIS representations are difficult to comprehend by farmers without proper training and assistance

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Opportunities for technology transfer: Data collection made easier

- The sequence of data collection, monitoring and evaluation (M&E) is made easier
 - \Rightarrow a vital part of development work being alleviated
- Improved data M&E \Rightarrow potentially better assistance to producers
 - Better knowledge of who and how they are, and of what they need
- A topic subject of exchanges of international experiences
 - being organized by the World Bank & FAO (e_agriculture forum)

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Many applications available for data M&E

Applied Data Logix et Octagon Data Systems Ltd http://www.adli.co.in/ - http://www.octagon.co.ke	India, Kenya
Cropster http://www.cropster.org	Latin America
Digital Purjee Information Service http://www.epurji.info/en_index.php	Bangladesh
Frontline SMS http://www.frontlinesms.com/	Worldwide
iFormBuilder http://www.iformbuilder.com/	Worldwide
Smartagro http://www.smartagro.net	Chili
Text to Change http://www.texttochange.org/	Africa

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Challenge of selecting the suitable material and commanding some applications

- iPod Touch recommended, because of the combination with Dual XGPS150 which could automatically collect GPS data

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Challenge of going beyond ICT

- Data M&E: Not only a matter of ICT
- Requirement for competent staff in conceiving questions, processing and interpreting data
 - Participatory approach helps
- Need for training
 - At both end: farmers and people to whom data are destined
- Challenge of ensuring the integrity of collected data
 - Protection by crypted message, recourse to passwords
 - Preserve farmers from invasion by spams
- Timely reach farmers with valuable information

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Conducive environment must be in place

- Prerequisite of access to electricity in rural areas
 - Adapted solution to be set up
- Programme must be financially sound
 - Make connections affordable
 - Incentives to farmers
- Modern ICT should not lead to overlook less modern information technology

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Opportunity of combining Modern ICT with diffusion through radio-broadcasting

- Radio broadcasting
 - cheapest diffusion mode
 - Highest potential to reach a large audience
- Challenge of making broadcasting available when farmers are!
 - i.e. on request of farmers when they are available and willing to listen
 - ≠ expecting that farmers make themselves available according to the broadcasting time table
- Cell phones can help to make request and adjust broadcasting timing
 - And even adjust to various local languages

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Challenge of transferring technology where the notion of yield is vague

- In Africa, farmers can seldom indicate yields and benefit per area unit they achieve
- They have no precise idea of the sizes of the plots they grow on
- Plots are seldom delimited
- Some delimitation like planting trees is socially disputable when farmers have only usufruct rights
- Challenge of figuring out new and acceptable delimitation modes of plots

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Challenge of enabling producers to keep records of their production inputs and outputs (1/2)

- Technology transfer should lead to an evolution of change (progress) which must be documented at each farmer's level
- No knowledge of any experience assisting farmers in keeping record
 - In spite of existing information at the level of the services in charge of service provision to farmers
 - Issue of no organization to feed back information obtained from farmers
- Farmers' illiteracy = bad argument of not leaving written records along farmers

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Challenge of enabling producers to keep records of their production inputs and outputs (2/2)

- Matter of investment
 - Provide a written basis to each producer
 - Update the written basis every year
- Matter of innovation
 - Carry out suitable medium of written records to be kept by farmers
 - Suitable?
 - Adapted to bad conditions of preservation in farmers' houses
 - Adapted to annual update
- Investment is worthwhile because of the great prospects of improved relationship between producers and extensionists

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Information is key? No, only accurate information is!

- Crucial issue with regard to technology embedded into specific products
- Challenge of enabling to distinguish genuine from fake products
 - Quality control is key
 - from reliable and independent body
 - Involvement of public authorities
 - But seldom in place for lack of will and means

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Actual adoption of technology not only influenced by information

- But also by actual and timely access to the needed inputs
 - Access might be troublesome even for basic inputs such as seeds, fertilizers and insecticides
 - Production credit used to lack
- The challenge of actual provision of inputs asks for cotton sector organization and political will
 - With documented successes
- The challenge of production credit remains generally ignored
 - \Rightarrow risk of cotton profit being captured by informal and usurious money lenders
 - Benin in 2012: annual interest rate > 200%!!

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Actual adoption of technology not only influenced by information

- But also by the certainty of selling out cotton at an acceptable price with acceptable variation between years
- Challenge being met in various ways
 - Beyond market coordination through price administration
 - In line with market coordination through insurance or warrantage tools
- Key requirement of political will
 - Counter-example: China and its cotton decline in the two traditional regions of cotton production

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Concluding remarks (1/2)

- Diffusion of information is key to promote technology transfer
- Diffusion of reliable information, resulting from actual quality control, is furthermore crucial when fake products exist
- In Africa, ICT provide opportunities for better information diffusion
 - not to reach directly producers but to improve coordination and service provision by other stakeholders of cotton sector
 - An aspect still marginally considered in existing experiences

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Concluding remarks (2/2)

- Expected gain from technology transfer must be documented at farmers' level
 - Areas of cropped plots must be better known to sustain the notion of yield
 - Innovation is required to keep record of production inputs and outputs
- Real adoption of technology asks more than information diffusion, such as
 - Actual access to production inputs and credit
 - Reduced perception of production risk
- Beware of the illusion of ICT to improve transfer without additional actions
- Political will and sectoral organization remain key factors for the adoption of technologies

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